International Journal Software Engineering and Computer Science (IJSECS)
5 (1), 2025, 29-39
Published Online April 2025 in IJSECS (http://www.journal.lembagakita.org/index.php/ijsecs)
P-ISSN: 2776-4869, E-ISSN: 2776-3242. DOI: https://doi.org/10.35870/ijsecs.v5i1.3396.

RESEARCH ARTICLE Open Access

The UI/UX Design of a Mobile-Based Catering Application Using the Activity Centered Design Method

Faizal Rahmadani *
Informatics Engineering Study Program, Universitas Kristen Satya Wacana, Salatiga City, Central Java Province, Indonesia.
Corresponding Email: 672021233@student.uksw.edu.

Yeremia Alfa Susetyo
Informatics Engineering Study Program, Universitas Kristen Satya Wacana, Salatiga City, Central Java Province, Indonesia.
Email: yeremia.alfa@uksw.edu.

Received: November 29, 2024; Accepted: January 15, 2025; Published: April 1, 2025.

Abstract: Catering services represent a practical option to meet individual food requirements. Having catering services available will help people find solutions for their food requirements more easily. The catering industry stands out as one of the most profitable business sectors. The support of this factor leads many individuals to choose catering services or to open their catering businesses. The process of placing catering orders by users and managing catering businesses by owners remains conventional. This study intends to establish UI UX elements for a mobile-based catering app through Activity Centered Design methodology. The Activity Centered Design method targets the specific activities performed by future users when they engage tasks. The product feasibility for potential users requires the execution of the Requirements stage followed by Design phase then Implementation phase and finally the Evaluation stage. The completed stages lead to the acquisition of feasibility testing results by measuring prospective users' satisfaction levels. The assessment of adjectives showed that the test achieved an 83.5 score which falls under the "Good" category and corresponds to an "A" grade.

Keywords: Catering; UI/UX; Activity Centered Design.

1. Introduction

Catering is one of the fastest growing food businesses today, especially in Indonesia. This is influenced by the results of the culinary business that generate profits that can be felt by catering business owners. All of that is inseparable from the great effects produced for the community. Basically, the catering business is engaged in food manufacturing services whose impact is very influential for many parties [1]. However, currently the transactions carried out in the catering ordering process still use conventional methods. In conventional ordering, customers need more costs to start ordering and this makes many customers complain [2]. In addition, manually recording orders and menu availability from caterers has a greater potential for error. These problems have a negative impact on catering business owners and customers [3].

Current technological developments have covered various aspects of daily life so that they have a positive impact on people's lives. In this research, technological developments can also help to facilitate the catering business in running its business [4]. However, there are still not many who apply technology to their catering business. This has a bad impact from both the business and customer side because it has a negative impact. From the business side, this sometimes has the potential for errors in recording orders and menu availability from the caterer [3]. Meanwhile, customers feel that the absence of digitalization of online ordering in this catering business creates difficulties in the ordering process [2]. Meanwhile, small and medium enterprises have turned to the industrial revolution 4.0 to carry out the digitization process. Some processes in business have moved to digitization, one of which is the transaction process that has started using an application [5]. Based on existing problems, implementation for digitalization in the catering business is needed in the industrial revolution 4.0. One of these implementations can be done by building an application for the transaction process to meet customer needs to place orders and also facilitate the business to be more optimal [6]. The first step in solving the problem is making UI UX from an application that will be made. UI UX is important in designing an application because it will make it easier for users to interact. In addition, UI UX is also useful as a means of knowing user needs. UI UX design also aims to ensure that the existing application design can run according to functionality [7]. Without UI UX, the application design cannot be measured whether it is acceptable to users or not [8]. Therefore, this research will design the UI UX of the catering application to solve the problems faced by the catering business.

To solve the problems that exist in the catering business, UI UX design is useful for optimizing the user experience with the solutions that have been provided [9]. This can be seen because UI UX design will help the application in determining a good interface and user satisfaction in using the application to solve problems [10]. In designing UI UX, a method is needed in the process to accommodate the needs of users. The method that will be used in designing UI UX for this catering business is Activity Centered Design which will focus on the activities of users. The concept of this method is "who does, what, and how" so that the design will be able to identify the tasks performed by users specifically. The case experienced in this catering business will be processed using the Activity Centered Design method to solve the problem through the application production process based on the existing business. This can be seen from the method that analyzes the activities of users as the focus.

The application of Activity Centered Design will be suitable for the case study that is the object of research, namely catering. The existing process in catering is a collection of activities that will be mapped based on their functionality. This method is used because in the case of catering there will be many processes that will be carried out as interaction activities ranging from how the catering business owner manages, to users who will carry out ordering activities from the catering. Thus, the design can be based on an analysis of the activities that users will carry out in the process so that the problems faced can be resolved [11].

UI UX design using the Activity Centered Design method will focus on activities that will be carried out by users. At the design stage using this method, user activity is a high-level goal in the results that will be obtained through the identification of problems that occur. In solving problems in the catering business, the Activity Centered Design method will produce a design that will conclude the interaction of users based on what activities will be carried out so that it matches the required solution [12]. This method has 4 stages that will be carried out in the process, namely, requirements, design, implementation, and evaluation based on user activity as the highest goal so that it can understand what solutions are needed in solving problems in the catering business [11].

Based on the background of the existing problems, this research aims to design UI UX mobile-based catering ordering applications that will be carried out using the Activity Centered Design method. With this research, it is expected to be useful as a solution to existing problems in the catering business such as facilitating transactions between catering business owners and users, making it easier for catering users to place orders, and making it easier for catering owners to manage orders. This research will also focus on activities that will be carried out by users to solve existing problems so that the solutions obtained are more relevant.

2. Related Work

Technological research focuses critically on the development of user interface design methodologies which new approaches strive to solve the complex issues related to developing meaningful digital experiences. This research explores recent theoretical advancements and practical applications in design methodologies with specific attention to Human-Centered Design (HCD) and Activity-Centered Design (ACD). Traditionally Human-Centered Design is considered an all-encompassing framework for building interfaces that gives highest importance to user requirements along with ergonomic factors. The study by Wijaya, Tolle, and Az-Zahra (2019) offers a detailed analysis of school catering ordering systems highlighting the methodological weaknesses when applied to specific settings [14]. Research shows that HCD gives important understanding about user interactions but fails to fully represent complex behaviors within specialized service areas. The primary flaw of this methodology is its excessive focus on personal user preferences which leads to a possible disregard for wider system interactions and contextual subtleties.

Activity-Centered Design stands out as a more comprehensive approach that delivers an advanced framework for analyzing how users engage with systems. The research by Wahyu and Hapsari (2021) demonstrates how personalized learning guides utilize a distinct methodology that shifts emphasis from single user experiences towards complete activity systems [12]. This approach enhances our understanding of interaction processes through its focus on activity as the fundamental unit of study. Activity-Centered Design enables more comprehensive exploration of user behavior and system dynamics by focusing on the full interaction ecosystem. Rezha, Maksom, and Naim (2014) validates the practical application of Activity-Centered Design through their investigation of smartphone interfaces for elderly users [15]. The research investigates the theoretical principles of activity theory to illustrate its effectiveness in solving difficult user interaction problems. The research shows how the methodology captures complex social interaction dynamics which offer novel insights surpassing traditional design approaches.

The results from a critical comparative analysis highlight essential directions for future interface design research. Human-Centered Design remains a useful method but faces difficulties when addressing the diverse aspects of today's digital interfaces. The design approach's emphasis on personal user needs results in oversimplified solutions that do not adequately address real-world interactive system complexities. Activity-Centered Design provides a complete theoretical framework which considers the larger context in which users interact. Research findings offer theoretical breakthroughs which hint at a fundamental change in how interface design is conceptualized. Researchers now understand that interactions should be seen as dynamic systems influenced by context instead of treating users as static individuals with unchanging needs. A more sophisticated understanding that merges psychological, sociological, and technological design insights is essential for this approach. The practical implications of this research are significant. Researchers and designers face the challenge of creating advanced methodologies designed to function effectively within complex digital environments. The conventional universal approach fails to meet the demands of ever-changing and varied user interactions. We need a context-sensitive method that exhibits greater adaptability.

Future research directions emerge from these insights. There is a clear need for: Future research should focus on creating hybrid design methods and developing more complete frameworks to comprehend user interactions as well as conducting empirical studies that confirm activity-based design processes and exploring design strategies across different contexts. Interface design methodologies continue to evolve as they tackle the technological challenge of developing digital experiences that adapt and maintain meaningfulness. The growing complexity of digital systems demands advanced skills to understand and build complex interactive systems. The design thinking community needs to keep advancing their methods to develop effective strategies for understanding and capturing the complex and evolving nature of human-technology interactions. Existing research receives a thorough analysis which establishes fundamental knowledge regarding contemporary interface design methods. This work identifies traditional design approach shortcomings and introduces Activity-Centered Design as an effective solution. Effective interface design of tomorrow will emerge from complete systems that understand human-digital system interactions instead of basic user-centered models.

3. Research Method

This research discusses the design of mobile-based catering applications intended for catering users and catering business owners. Therefore, the focus of this application design will be based on the activities of users. By considering the target users including the characteristics, needs, and preferences of users who refer to their activities, this research will refer to the Activity Centered Design (ACD) method [11]. The approach with the Activity Centered Design (ACD) method will focus on the activities of the target users who will use this application [12]. To understand the activities carried out by users seen in Figure 1, the research process

will be carried out by observation and interviews with 3 catering business owners and 5 catering users. In addition, a literature study on activity theory will be conducted [13].

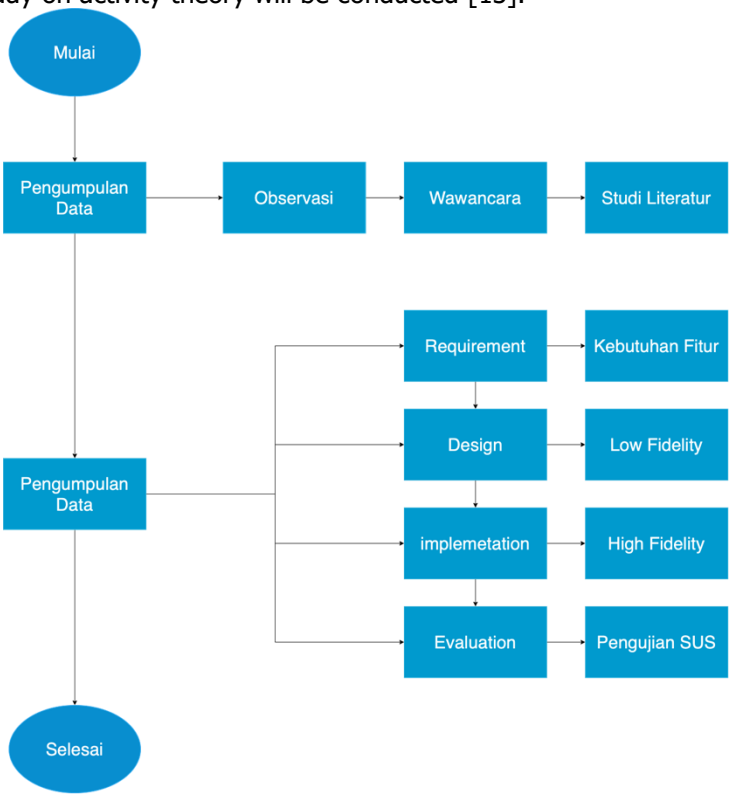

Figure 1. Research Process

In this research, several processes will be carried out to design a UI/UX design of the catering application to be made. This process starts with collecting data from potential users based on their activities to find out the needs that will be answered and continued in the product execution process based on the results of data collection. By referring to the Activity Centered Design (ACD) method, which uses four stages, namely: Requirements, Design, Implementation, and Evaluation [11], shown in Figure 2, all of these processes will be carried out from the beginning of the design to the end.

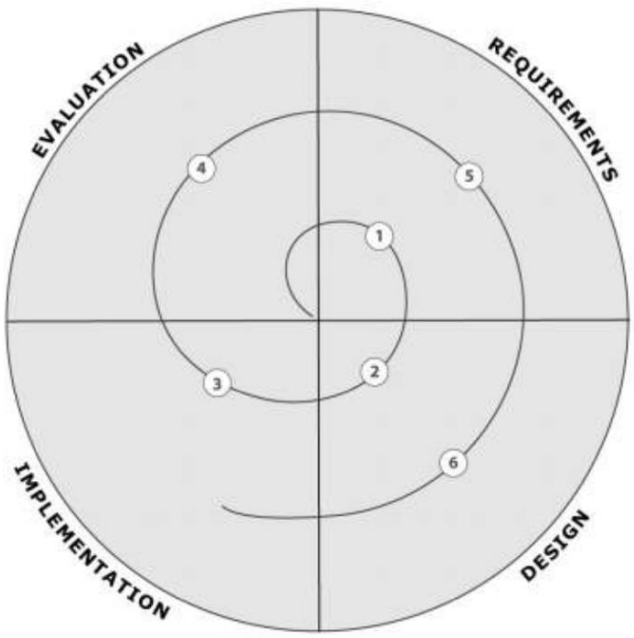

Figure 2. Activity Centered Design Process

In the initial stage, a *requirements* process will be carried out which aims to process the results of data collection from potential users, namely, catering users and catering business owners. This data collection process will be based on observations and interviews that will be conducted. In addition, a literature study of activity theory will be conducted. The implementation of these observations and interviews is used to make observations and ask questions that aim to get the problems experienced by prospective users [11]. In this process, interviews and observations will be conducted with 3 catering business people and 5 catering users. This is done with the aim of knowing what activities exist in the catering business process. From here it can also explore the problems of catering business people and catering users from existing activities. With this process, the existing results will be used as a reference in the requirements process in formulating the needs of prospective users for the design of the application to be designed.

The stage continued with the design design which was carried out after completing the requirements stage. This can be seen from the design that is made referring to the results obtained from observations and interviews and then formulating problems that are the needs of users. By paying attention to the requirements process, the design process will be more directed because it has a definite goal [11]. In this design process, a prototype will be made in the form of low fidelity as an illustration of the user flow of this application. This process contains what problems are faced by prospective users of the application. By looking at the activities carried out by users, problems and solutions will be mapped into features that underlie the creation of a complete application of catering business problems and are expected to be able to solve these problems.

After completing the *design* process*,* we will continue with *implementation* which is the development of the *design* process*.* At this stage, the concepts that have been defined in the form of *low fidelity* prototypes from the results of problem formulation in the *requirement* process will be applied to visual forms [11]. The concept that has been made before will be developed into an interactive *high fidelity* prototype [12]. Features needed by prospective users will be seen in visual form so that it is easier to identify in the form of activities that exist in the catering business process. Thus, the previous concept that is still in the form of a design will be able to be executed interactively. The last stage in this method is the evaluation process which is a test referring to the implementation of the design that has been designed based on the previous requirements. The test method that will be used in this process is the system usability scale (SUS) to measure the level of usability of the design implementation that has been made. Usability can be used to benchmark users when using this product. This evaluation aims to measure how much this product can meet the needs of users.

4. Result and Discussion

4.1 Results

This research consists of three main stages, namely analyzing the needs of potential users, design and implementation, and evaluation of application design and implementation.

4.1.1 Prospective User Needs Analysis

In the first stage, an observation and interview will be conducted with potential users to find out what problems are experienced by catering users and catering owners. The results of these interviews and observations are processed in the *requirements* process which will display problems and find out what the needs of users are. At this stage, several questions will be asked to 5 catering users and 3 catering business owners. The questions will be classified based on what activities are needed by prospective users, namely catering users and catering business owners. The classification of needs based on the activities performed from prospective users is shown in Table 1

Table 1. Ordering Catering Activity

No.	Activities
1	Choosing a caterer
2	Choosing a catering package
3	Approve the caterer
4	Perform payment transactions
5	Registered as a catering orderer
6	Selecting food and additional notes (per *day/random* batch)
7	Choose whether to deliver or pick up (per *day/batch*)
8	Select catering delivery or pickup time (per *day/batch*)
9	Choose a drop-off location (if delivered)
10	Confirmation of booking details from the *user*

	11	Confirmation of delivery or pickup time in the form of *feedback* from the caterer (before the time that has been chosen at the beginning, there will always be confirmation before delivery)
	12	Information if the order has been delivered in the form of location *tracking* (If delivered)
	13	*Feedback* if the order has been delivered or picked up automatically
	14	Order recording per day

Based on the results of interviews from catering users, several activities were carried out in the catering ordering process. The problems faced by catering users in the activities carried out are summarized in Table 2

Table 2. Problem and Solution

No.	Problems	Needs
1	Limited time to do in-person catering	Tool or platform for ordering applications at any time
2	Use of catering at all times but have to place manual orders	Order scheduling
3	Did not ask about allergies and could not *request a* menu.	Order *request* feature and allergy description
4	Unable to change the selected package	Order *edit* feature
5	No information on the location of the nearest caterer	Points and details of the catering location address
6	No notice when delivering or picking up catering	Scheduling of catering delivery times and *reminders* when catering is ready to be delivered or picked up.
7	Limited communication	*Chat* feature between users and caterers
8	Unable to get catering information with detailed price and package preferences	*Sorting* and *filtering of* prices and packages
9	Catering payments are still complicated, having to send proof of transfer manually	App-integrated *online* payment
10	The catering ordering process tends to be complicated	*Simple* order flow
11	There are some caterers that do not provide delivery options	Selection of delivery or pick-up options
12	No record of catering order dates and when catering ends	Recording of initial transactions, deliveries per day, and catering last date reminder
13	No information on the menu that will be provided per day	Information about the menu available for the day
14	No notification whether the catering has been delivered or not	Notification and *feedback* when catering has been delivered or picked up
15	No confirmation of where the catering has been delivered to	Location *tracking* during catering delivery

Interviews were also addressed to catering business owners to find out the activities carried out in catering management. Table 3 shows the results of interviews conducted and results in activities carried out by catering business owners

Table 3. Manage Catering Activity

No.	Activities
1	Menu List
2	Add Menu and Details
3	Update Menu and Details
4	Personalize Catering Details
5	Check Incoming Order Details
6	Check Active Order Details
7	Check Order History Details
8	Check Order Payment Total Details
9	Monitoring Entry Details

10	Confirmation of booking details from the *user*
11	Confirm Delivery Options
12	Order Status Tracking

These activities are a series obtained from interviews that have been conducted with catering business owners. Based on the activities carried out, several problems encountered by users have been summarized in Table 4.

Table 4. Problem and Solution for Catering Business

No.	Problems	Needs
1	Applications that are still fragmented in catering management	Create a *platform* that can address multiple cases in one *platform*
2	Manual and non-centralized order recording	Creation of features for order recording
3	Manual calculation of catering costs	Calculation of catering payment in the app
4	No clear options available	*Display* menu as a menu option available to the *user*
5	Payments are made manually, making it difficult to manage.	Centralized payment in one app
6	Calculation of *stock* and materials must wait for a long time for confirmation	Recording the number of orders on hand
7	Difficulty of manual order data collection	Order data to be created
8	Inaccurate order data due to manual	Monitoring existing orders by system
9	Unable to monitor orders regularly	Order *tracking* feature
10	Payments that are still unclear result in confusion	Price settings that will be displayed according to the options

4.1.2 Design and Implementation

Based on the results of analyzing the needs of prospective users, it can be concluded that the activities carried out and the problems that exist. This is used as a basis for making the design and implementation of an application. At this stage, the design and implementation of the requirements results will be carried out to present the visual form of the solution offered. Thus, users can more easily understand the existing solutions to overcome the problems that existed before. The results of the analysis of the needs of prospective users resulted in two main activities, namely catering ordering activities and catering management activities. From these activities, it produces problems and needs from prospective users so that they can be realized into features in an application that is a solution to the needs of prospective users. Table 5 shows a summary of solutions that have been classified in the form of application features.

Table 5. Application Feature Clasification

No.	Activities	Feature Description
1	Catering Reservations	Display information of available caterers based on location and price
		Display detailed information of the caterer
		Display details of the packages owned by the caterer
		Place catering orders directly from the app
		Organize catering order details
		Make payments directly in the app
		Selecting a package menu based on what the caterer provides as well as requests for orders (allergies, order time, pickup method).
		Display the currently active package and its details
		Display active order *tracking*
		Recording order history from transaction, delivery, and remaining orders
2	Catering Management	Displays menus that have been created as well as active and inactive information
		Action to add menu and edit menu

	Customize order details
	Display a list of incoming orders
	Displays the orders to be created and their details
	Display active orders by package
	Action to confirm the package that has been created
	Display the delivery history of completed orders
	Display transaction history to manage income

The features that have been obtained will be realized into a visual design to make it easier for potential users to understand the solution that will be presented. Thus, potential users can measure whether their problems can be solved with the existing design. In the visualization process, Figma will be used as an application that facilitates the creation of *interface* designs from the features that already exist in the data. This design is divided into two main activities, namely catering ordering activities in Figure 3 and catering management activities in Figure 4.

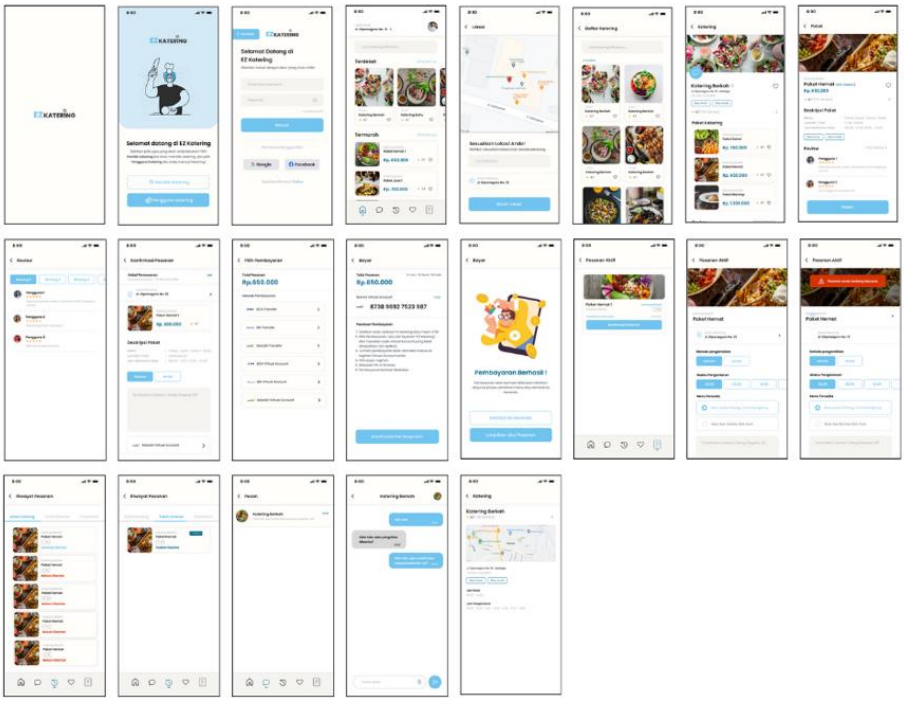

Figure 3. UI Design of Catering Order

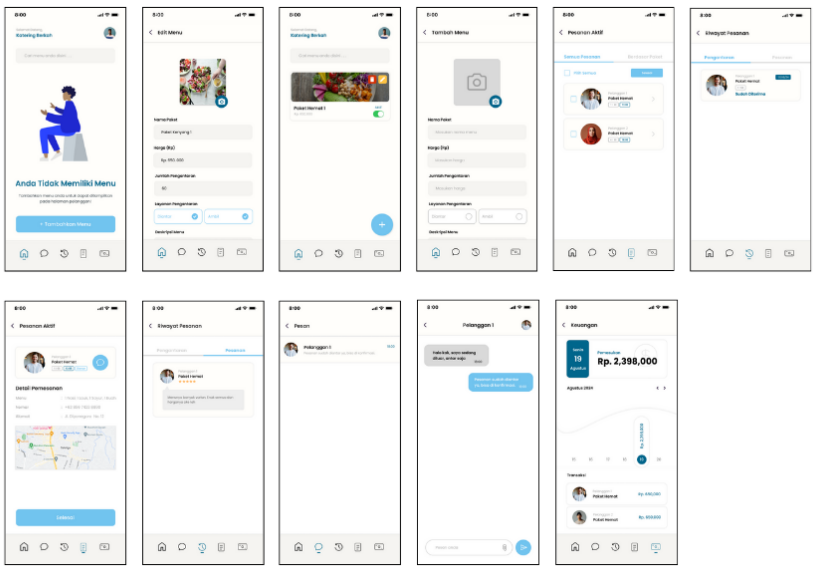

Figure 4. UI Design of Manage Order

4.1.3 Evaluation of Application Design and Implementation

The last stage carried out in this study is the interface design evaluation stage of the system that has been made. At this stage the evaluation will be carried out using the System Usability Scale (SUS) method. This stage is carried out by distributing questionnaires containing 10 questions (1-10) which have a scale of 1 to 5. Respondents work on tasks from the application that has been done after that filling out a questionnaire that represents how satisfied the respondent is using the existing application design. Thus, it can be concluded whether the design made is feasible and can solve the problems that exist in respondents.

Table 6. Rating Scale

Statement	Scale
Strongly Disagree	1
Disagree	2
Undecided - Undecided	3
Agree	4
Strongly Agree	5

The calculation of the SUS score for this evaluation will be carried out with several existing provisions and has been filled in by 22 respondents. To calculate the final score of the respondent's answer as an interface design evaluation process will go through several steps. First, questions that have odd numbers (1,3,5,7,9) will be reduced by 1 on each score. The formula is x-1 where x is the score of the odd numbered question. Second, questions that have even numbers (2,4,6,8,10) will have their scores used to subtract 5 from each even number question. The formula is 5-x where x is the score of the even numbered questions. Furthermore, the results of all questions will be summed up and multiplied by 2.5 to produce a final score that has a scale of 0-100. After getting the final score from each respondent, a calculation will be made by summing up the final scores of all respondents and dividing by the number of respondents available. Based on the distribution of questionnaires that have been filled in by 22 respondents, the final results will be calculated using the SUS method for the evaluation of the existing interface design. This is also used as a reference whether this design can meet the needs of potential users. The results of SUS calculations from respondents are presented in Table 7.

Table 7. SUS Test Results

Respondents	X1	X2	X3	X4	X5	...	X10	Total	Value
R1	4	2	5	1	5		2	34	85
R2	5	1	5	1	5		1	40	100
R3	5	1	5	1	5		3	35	87.5
R4	4	1	5	1	4		1	37	92.5
R5	5	1	5	1	5		1	40	100
						...			
R22	3	2	4	1	4		2	29	72.5
Total									1837.5
Average Score									83.52272727
Description									*Good*

4.2 Discussion

In the test that has been conducted by distributing questionnaires to 22 respondents, the final SUS score was 83.5. This score indicates that the interface design of the catering application developed is in the "Acceptable" category in the Acceptability Range, and in Adjective Ratings, the result is "Good". This is in line with research showing that evaluation of the user interface by involving users directly can provide a clearer picture of user acceptance [16]. In previous studies, it was also revealed that applications that design interfaces based on user cultural and language preferences can be more accepted, improving usability and user experience [17]. In addition, the importance of evaluation methods involving user feedback in mobile application development has been emphasized in various studies; this includes voice-based testing and adjustments to create a more responsive interface to the user experience [18].

As seen in Figure 5, the existing application design shows that this interface is accepted by users with a Grade B Scale at the acceptance level. This also reflects the understanding that proper design and field testing can play a big role in increasing user satisfaction [19]. A comprehensive evaluation, including the context of use and learning from user behavior, is essential in creating a satisfying mobile interface [20]. Therefore, this high SUS score indicates that the approach used in the design, namely Activity Centered Design, was successful in achieving this goal.

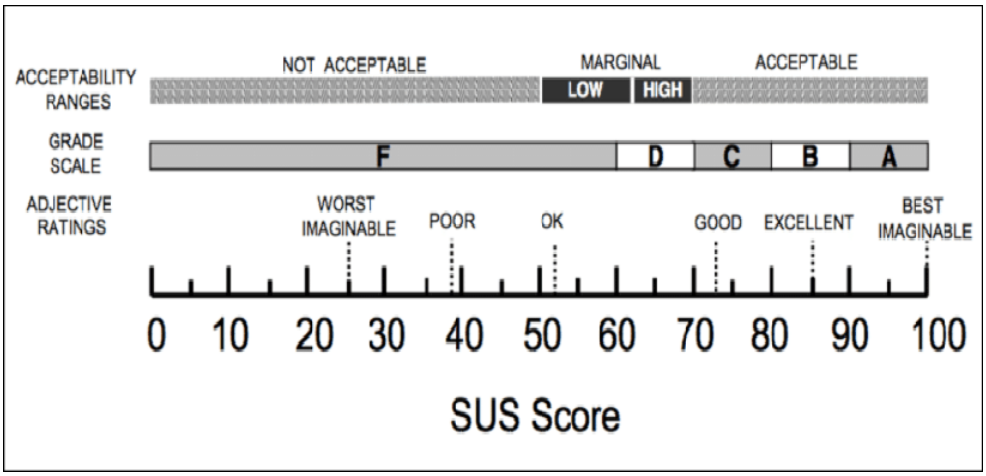

Figure 5. SUS Score

5. Conclusion and Recomendations

From the research that has been done, it can be concluded that the UI UX design of the catering ordering application that has been made is acceptable and easy to use for catering users. This can be seen from the results of a survey conducted with 22 people and tested using the System Usability Scale (SUS). In the test, the score obtained was 83.5 which means that the interface design of this application is in the Good category on Adjective Ratings. Meanwhile, the result for the Grade Scale in the test was "B". Referring to the existing test results, the design of the catering ordering application that has been made gets good acceptance for potential users so that it is feasible to use. The results of this study have limitations in taking the diversity of respondents which makes the subjectivity in this study still tend to be high. It is hoped that in future studies, the diversity of respondents can be evaluated in order to obtain a higher level of objectivity.

References

[1] Aswadi, M., Kemas, A. K., Apriza, D., & Sutabri, T. (2023). Rancangan UI/UX start up catering menggunakan metode design thinking untuk wilayah Kota Palembang. *TEKNIKA*, 17(2), 1-5.

[2] Syani, M. (2019). Perancangan aplikasi pemesanan catering berbasis mobile android. *Jurnal Ilmiah Ilmu dan Teknologi Rekayasa*, *2*(2).

[3] Ammar, A., Maulana, M. Z., Novella, T. J., Hawari, S., & Nuraminah, A. (2021). Perancangan dan implementasi catering ordering system "Hena Catering" menggunakan Rapid Application Development. *Prosiding Seminar Nasional Mahasiswa Bidang Ilmu Komputer dan Aplikasinya*, 2(1), 31-39.

[4] Alam, S., & Ika, N. (2021). Perancangan aplikasi e-catering pada usaha Rabila Catering berbasis web menggunakan notifikasi WhatsApp gateway. *Jurnal Sintaks Logika*, 1(2), 123-131. https://doi.org/10.31850/jsilog.v1i2.1230

[5] Khawarozni, M. N., Pangestu, A. D., & Awaludin, A. A. R. (2023). Perancangan sistem aplikasi penjualan pada Katering DIA Depok berbasis Java. *Jurnal Riset dan Aplikasi Mahasiswa Informatika (JRAMI)*, 4(1), 55-60. https://doi.org/10.30998/jrami.v4i01.4790

[6] Putra, B. D. (2023). Pengembangan sistem informasi pemesanan catering berbasis website dengan metode Extreme Programming. *Jurnal Teknologi Pintar*, 3(9), 1-10.

[7] Anggoro, A., & Mailangkay, A. B. (2021). Perancangan UI/UX aplikasi Android online monitoring kualitas air (ONLIMO) di BPPT menggunakan metode User Centered Design. *Prosiding Seminar Nasional*, 1, 24-26.

[8] Wijareni, N., Muhimmah, I., & Rani, S. (2023). Pengujian usabilitas dengan Cognitive Walkthrough dan System Usability Scale terhadap aplikasi UII Skin Analyzer. *AUTOMATA*, 4(1), 1-10.

[9] Ratnaningsih, D., & Rifai, A. (2024). Perancangan UI/UX design aplikasi penilaian e-raport dengan metode pendekatan Design Thinking. *Journal of Computer Science and Information Technology*, 1(2), 75-88. https://doi.org/10.59407/jcsit.v1i2.559

[10] Ulfa, M., Faishol, A. D., Atika, L., Agustini, E. P., & Purwaningtias, F. (2024). Pelaksanaan pelatihan program studi independen UI/UX design di PT. ImpactByte Teknologi Edukasi. *Jurnal Pengabdian Kolaborasi dan Inovasi IPTEKS*, 2(1), 110-122. https://doi.org/10.59407/jpki2.v2i1.397

[11] Irawan, T., Mutawalli, L., & Zaen, M. T. A. (2023). RESOLUSI: Rekayasa Teknik Informatika dan Informasi Implementasi Activity-Centered Design dalam merancang user interface E-Custom. *Media Online*, 4(2). Retrieved from https://djournals.com/resolusi

[12] Wahyu, S., & Hapsari, I. N. (2021). Perancangan interaksi panduan pembelajaran berbasis personalisasi menggunakan Activity-Centered Design: Designing interaction for personalized learning guide using Activity-Centered Design. *Cogito Smart Journal*, 7(2), 1-10.

[13] Uden, L., & Willis, N. (2001). Designing user interfaces using activity theory. In *Proceedings of the 34th Annual Hawaii International Conference on System Sciences* (pp. 135). IEEE. https://doi.org/10.1109/HICSS.2001.926547

[14] Wijaya, R. P. H., Tolle, H., & Az-Zahra, H. M. (2019). Perancangan user experience aplikasi pemesanan katering sekolah dengan menggunakan metode Human-Centered Design. *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, 3(3), 3086-3093. Retrieved from https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/4875

[15] Rezha, N. A., Maksom, Z., & Naim, C. P. (2014). Tackling design issues on elderly smartphone interface design using activity centered design approach. *ARPN Journal of Engineering and Applied Sciences*, 9(8), 1190-1196.

[16] Hamed, S., & Ahmadi, A. (2017). Survey of designing user interface for mobile applications. *Journal of Advances in Technology and Engineering Research*, 3(2), 1-10. https://doi.org/10.20474/jater-3.2.4

[17] Alsswey, A., Al-Samarraie, H., El-Qirem, F., Alzahrani, A., & Alfarraj, O. (2020). Culture in the design of mhealth UI. *The Electronic Library*, 38(2), 257-272. https://doi.org/10.1108/el-04-2019-0097

[18] Budacu, E. (2019). Automating user experience testing in mobile development teams. https://doi.org/10.12948/ie2019.05.05

[19] Hussain, J., Hassan, A., Bilal, H., Ali, R., Afzal, M., Hussain, S., ... & Lee, S. (2018). Model-based adaptive user interface based on context and user experience evaluation. *Journal on Multimodal User Interfaces*, 12(1), 1-16. https://doi.org/10.1007/s12193-018-0258-2

[20] Iqbal, M., Ahmad, N., Khuram, S., Feroz, I., & Ali, N. (2018). Towards adaptive user interfaces for mobile-phone in smart world. *International Journal of Advanced Computer Science and Applications*, 9(11). https://doi.org/10.14569/ijacsa.2018.091177.